

DIVISION 400 ASPHALT PAVEMENTS

SECTION 401

PRIME AND TACK COATS AND EMULSIFIED ASPHALT IN BASE COURSE

401.01 GENERAL. Prime Coat and Emulsified Asphalt in Base Course help seal water out of the base below and bind the next course of material (Hot Mix Asphalt, Asphalt Surface Treatment, etc.) to the base. Tack Coat helps bind successive courses of Asphalt Cement Hot Mix to each other. Specifications require that Prime and Tack be applied using a calibrated distributor in good repair. Surfaces should be clean and free of foreign material, (including excess crack filler). Once applied, areas damaged due to Contractor negligence will be repaired at the Contractor's expense. This includes cases where the Contractor has applied prime or tack coat and does not schedule his work appropriately to get the area covered in a timely manner.

NOTE: TIME SHALL BE ASSESSED ACCORDING TO WORKING CONDITIONS DURING THE CURING OF PRIME COAT.

(a) Control of Materials. (1) Asphalt. The Specifications allow the following materials to be used for the pay item listed:

Pay Item	Materials Allowed
Prime Coat	Medium Curing Cutbacks Asphalt Penetrating Prime
Tack Coat	Rapid Curing Cutbacks Emulsified Asphalts
Emulsified Asphalt in Base Course	SS-1, SS-1h, CSS-1, CSS-1h

The Resident Engineer must ensure that approval of these asphalts is properly documented in accordance with the *Manual of Field Sampling and Testing Procedures* prior to use. In addition, Destination Samples may be requested for liquid asphalts, as per the *Manual of Field Sampling and Testing Procedures*.

(2) Blotter Course Material. This should be a clean, sandy material. It is used to blot excess prime so that traffic can use a newly primed area without inconvenience. This is used only when directed by the Engineer.

Blotting of a primed surface for the express purpose of facilitating Contractor operations shall be at the Contractor's expense.

401.02 METHOD OF MEASUREMENT. (a) Asphalt. Asphalt is measured by the gallon (liter). The measurement shall be made by "sticking" the distributor immediately before and again immediately after the material is applied. These readings shall be recorded on Form 19-208 (19-208 m), "Daily Report for (Prime, Tack)". The difference in the two readings shall be corrected to 60°F (15°C) in accordance with

Subsection 109.01(g) of the Standard Specifications (see Correction Tables in *Appendix IV* of this Manual). Water added to dilute Emulsified Asphalt will not be included for payment.

(b) Blotter Course. Blotter Course material is measured and paid for by either the cubic yard (cubic meter) in trucks or by the ton (metric ton). *Section 109* of this Manual describes the procedures to be followed for both types of measurement. Scale calibration certificates and weight tickets (and documentation of conversion between cubic yard and ton [cubic meter and metric ton], if used) shall be handled in accordance with *Section 109* of this Manual.

401.03 DOCUMENTATION - CURRENT AND FINAL ESTIMATES. Completed Form(s) 19-208 (19-208m), "Daily Report For (Prime, Tack)" shall be used as Original Source Document(s) for Tack Coat, Prime Coat, and Emulsified Asphalt in Base Course (Refer to *Appendix III* of this Manual for instructions for completing this form.) No further documentation is necessary for payment on Current and Final Estimates. As an alternate, an EXCEL spreadsheet found on the LAN may be utilized (*Csd4Construc\Misc\Tack.xls*).

NOTE: The inspector must obtain the asphalt distributor calibration(s) for the distributor(s) used prior to commencing work. A copy must be attached to the first applicable Daily Report.

Current and Final Estimate documentation for Blotter Course Material shall be in the same manner as Selected Material shown in *Subsection 302.03* of this Manual.

SECTION 402 ASPHALT SURFACE TREATMENT

402.01 GENERAL. An "Asphalt Surface Treatment" consists of the application of "Asphalt in Surface Treatment" and "Mineral Aggregate in Asphalt Surface Treatment (Class ____)".

(a) Materials. Materials and equipment shall comply with the requirements of Section 403. In accordance with Subsection 402.01 of the Standard Specifications, the Contractor may substitute ACHM Surface Course (1/2" [12.5 mm] or 3/8" [9.5 mm]) in lieu of Asphalt Surface Treatment. If such substitution is made, the requirements of Sections 404, 406, and 409 shall apply.

(b) Construction Methods. The surface to which the "Asphalt Surface Treatment" is applied must be clean and dry. Mineral aggregate is applied immediately behind the asphalt, and a minimum of two rollers, one of which must be pneumatic, must roll the Asphalt Surface Treatment a minimum of three times immediately after the mineral aggregate is applied. After the "final set" of the asphalt and no later than 48 hours after application, a rotary broom shall lightly sweep the surface to remove excess aggregate. Allow minimum curing time between successive applications in accordance with Subsection 402.03(f) of the Specifications.

NOTE: Brooming should be done during the cooler hours of the day and in such a manner as to not displace aggregate embedded in the asphalt.

(c) **Temperature and Seasonal Limitations.** The minimum temperature for work on this item is 60°F (15°C). In addition, Asphalt Surface Treatment may be applied only during the following periods:

Traveled Lanes	April 15 to September 30
Shoulders	April 1 to October 31

If the Contractor desires to apply the surface outside of these dates, a request may be made to use Asphalt Concrete Hot Mix Surface Course in lieu of Asphalt Surface Treatment, in accordance with Subsection 402.01.

402.02 METHOD OF MEASUREMENT. (a) Asphalt in Surface Treatment. Asphalt in Surface Treatment is measured in the same manner as Prime Coat. See Section 401 of this Manual. Form 19-209 (19-209 m), "Daily Report For Bituminous Surface Treatment" shall be used to document the measurement and correction to 60°F (15°C).

(b) **Mineral Aggregate in Asphalt Surface Treatment.** Mineral Aggregate in Asphalt Surface Treatment is measured and paid for either by the cubic yard (cubic meter) in trucks or by the ton (metric ton). *Section 109* of this Manual describes the procedures to be followed for both types of measurement. Scale calibration certificate and weight tickets (and documentation of conversion between cubic yard and ton [cubic meter and metric ton], if used) shall be handled in accordance with *Section 109* of this Manual. Loads/truck weights shall be documented on Form 19-209 (19-209 m).

(c) **Substitution of ACHM.** If the Contractor elects to substitute ACHM for the Asphalt Surface Treatment, the method of measurement of the ACHM placed shall be the same as for ACHM Base Course (See *Section 405* of this Manual). A note stating that the material was used in lieu of "Asphalt Surface Treatment" should be placed in the "comments" portion of each report. The total weight of the mix placed shall be used along with the measurement of the area covered in square yards (square meters) to determine the actual rate of application.

If the actual rate of application is equal to or greater than that shown in Subsection 402.01 of the Standard Specifications, the quantities of Asphalt in Surface Treatment and Mineral Aggregate in Asphalt Surface Treatment are computed using the plan rates for the actual area covered. These calculations and the ACHM Daily Reports showing the actual quantity and rates are the Original Source Documents.

If the actual rate of application is less than that specified, the calculated quantities for Asphalt in Surface Treatment and Mineral Aggregate in Asphalt Surface Treatment shall be adjusted in accordance with the table in Subsection 402.06(c) of the Standard Specifications.

NOTE: If the Contractor elects to lay ACHM for both pay and for substitution of Asphalt Surface Treatment at the same time (example: ACHM traveled lane and AST

shoulder) the Resident Engineer should accurately determine the amount of ACHM placed on the shoulders and document this plainly on the daily ACHM report.

402.03 DOCUMENTATION - CURRENT AND FINAL ESTIMATES. Completed Form(s) 19-209 (19-209m), "Daily Report For Bituminous Surface Treatment" shall be used as Original Source Document(s) for "Asphalt in Surface Treatment" and "Mineral Aggregate in Asphalt Surface Treatment (Class ____)". (Refer to Appendix III of this Manual.) No further documentation is necessary for payment on Current and Final Estimates.

When ACHM Surface Course is substituted for "Asphalt Surface Treatment", the documentation for Current and Final Estimates shall include:

1. The Daily Reports for the ACHM Surface Course placed. These should contain the ACHM measurements and calculations of the area covered as well as a note stating that the material was used in lieu of "Asphalt Surface Treatment" on each report.
2. Completed forms 19-209 (19-209 m), "Daily Report of Bituminous Surface Treatment." The applicable portions of this should be completed daily and should contain the calculations for the quantities of Asphalt in Surface Treatment and Mineral Aggregate in Asphalt Surface Treatment based on the plan rates and the actual area covered.

SECTION 403

MATERIALS AND EQUIPMENT FOR PRIME, TACK, AND ASPHALT SURFACE TREATMENTS

403.01 MATERIALS. This section of the Specifications identifies the testing requirements with which the materials used in Prime, Tack, and Asphalt Surface Treatment must comply.

Liquid Asphalts must be approved prior to use in accordance with the *Manual of Field Sampling and Testing Procedures*. The Resident Engineer should also ensure that Destination samples are also obtained in accordance with the frequency required by the *Manual of Field Sampling and Testing Procedures*.

Mineral Aggregates should be tested prior to beginning the work and as Construction progresses, also in accordance with the *Manual of Field Sampling and Testing Procedures*.

403.02 EQUIPMENT. This section of the Specifications also describes the equipment requirements for proper application of Prime, Tack, and Asphalt Surface Treatment. It should be used as a reference whenever these operations begin.

NOTE: The inspector must obtain the asphalt distributor calibration(s) for the distributor(s) used prior to commencing work.

SECTION 404
DESIGN AND QUALITY CONTROL OF ASPHALT MIXTURES

404.01 GENERAL. This item consists of the Contractor providing to the Department an acceptable Asphalt Mix Design and performing Quality Control testing in the manner and frequency specified.

404.02 Design of Asphalt Mixtures. The AHTD does not perform prebid testing for the Contractor. The Contractor is responsible for locating material sources, and for all sampling and testing required to provide the Department with an acceptable Asphalt Mix Design. Any additive proposed for use must be from the Department's QPL.

The mix design, along with copies of all test results and design work papers, is submitted direct to the AHTD Materials Engineer for review. Refer to Subsection 404.01 of the Specifications for items required to be included in the mix design. The Standard Specifications require that all mix designs must be performed by a laboratory either listed on the Department's Qualified Products List or accredited by AASHTO.

If the Contractor submits a proposed Asphalt Mix Design to the Resident Engineer, all information submitted should be forwarded directly to the Engineer of Materials as soon as possible for review. After completion of the review, the Engineer of Materials will accept or reject, in writing, the mix design. A mix design will be accepted only for a specific type of mix, materials sources, and the plant to be used. A CHANGE IN ANY MATERIALS SOURCE WILL REQUIRE A DIFFERENT MIX DESIGN.

The Contractor will notify the Resident Engineer in writing of the accepted mix design proposed for use on a specific project and provide copies of the mix design to the Resident Engineer. The Resident Engineer will approve an accepted mix design for use on each project. (Wheel Tracking Test results are required for projects let under the 2003 Standard Specifications For Highway Construction. Also, PG70-22 and PG76-22 asphalt binders have an elongation recovery requirement in the 2003 Specifications.) Only one mix design for each type of mix will be active (approved for use on highway projects) at any one plant at any time. A maximum of two other accepted mix designs for each type of mix will be considered inactive. If a change of mix design is desired, the Contractor shall notify the Resident Engineer and request permission to change the mix design. Arbitrary changes of an active mix design will not be approved by the Engineer.

Asphalt Mix Designs accepted by the Department become the property of the Department. They may be proposed for use on other projects by other Contractors, if the same materials are to be used and the Hot Mix Asphalt meets the planned design requirements.

If an acceptable pavement is not produced and it is determined that the accepted mix design is at fault, paving operations shall be stopped and the Contractor shall prepare a new mix design. The processing of proposed changes or new designs shall follow the same procedures as the initial mix designs.

NOTE: The Resident Engineer shall send Materials Division (with a copy of the Mix Design) and Construction Division each a copy of the transmittal letter notifying the Contractor when an accepted mix design is approved for use on a project

404.03 Substitutions. Substitutions of specified courses will be allowed only on shoulders leveling, and incidental or temporary construction. See subsection 404.03 of the Standard Specifications for specific substitutions permitted.

If there is no accepted mix design for the ACHM type called for on the plans, the mix composition for purposes of payment will be whichever of the following that results in the lowest cost per ton of mix to the Department:

1. The mixture composition shown on the plans as the "Basis of Estimate" for the original ACHM mix specified, or
2. The accepted mix design for the ACHM mix that is actually used.

If there is an accepted mix design for the type of ACHM called for on the plans, then the payment will be whichever of the following that results in the lowest cost per ton of mix to the Department:

1. The accepted mix design for the original ACHM mix specified, or
2. The accepted mix design for the ACHM mix that is actually used.

Calculations and/or total costs used in determining which of these is the lowest cost per ton of mix should be shown under Remarks on the first Daily report on which the substitution is used.

Arbitrary and intermittent substitutions of small quantities of mixtures will not be permitted.

404.04 (a) Field Verification and Adjustments to the Mix Design. The accepted mix design must be field verified by the Contractor at the start of mix production or after an interruption of more than 90 days. This is a very important step and should be witnessed and possibly verified by the Department's inspector. Per *Subsection 404.04* of the Specifications, verification will begin with testing mix that has been produced through the plant using the aggregate proportions shown on the accepted mix design.

Mix designs are considered verified if:

- Test values for air voids and VMA are within the compliance limits.
- The mix design has been produced within the gradation tolerances shown in Subsection 404.04 of the Specifications.
- The asphalt binder content is within the compliance limits.

For details regarding verification of mix designs, refer to Subsection 404.04 of the Specifications.

NOTE: Field Mix Designs are not required to have wheel tracking test results. Only one Field Mix Design variant from the original mix design should be allowed. Any

other changes to the accepted (or field) mix design will require the development of another laboratory mix design, submission and approval by Materials Division, and verification as described in Subsection 404.04 of the Specifications.

(b) Changes during Mix Production. The Specifications require that the Department's Asphalt Plant Inspector be notified of any corrective actions before making the correction. Only aggregate cold feeds may be adjusted without submitting a new mix design once the mix design has been verified or a field mix design accepted. Each individual cold feed may be adjusted no more than an amount that is sufficient to produce the specified air voids, VMA, & VFA within the tolerances of the accepted (or field) mix design. If excessive changes are required, production of the mix should be stopped and a new mix design should be required.

404.05 Quality Control. The Contractor is responsible for all quality control sampling and testing for ACHM mixes as well as determining the location and frequency for the sampling, with the exception of aggregate gradation testing. The specifications contain a set frequency for aggregate gradation testing by the Contractor. The Resident Engineer must obtain and test aggregate samples for verification purposes at the frequencies shown in the *Manual of Field Sampling and Testing Procedures*. See *Subsection 106.02* of this Manual regarding observation of contractor testing and *Subsection 106.04* regarding verification testing.

The Contractor is required by the Specifications to maintain a daily plot of all test results. These plots are to be available to the Resident Engineer and should be reviewed by the RE periodically to see that the contractor's quality control tests indicate that an acceptable mix is being produced. This plot is particularly useful when a dispute arises as the result of verification testing.

The Contractor is required to determine the water sensitivity of the mix being produced at least once during:

- the first three days of production of each mix type,
- the first three days of production of a new mix design,
- the first three days of production after an interruption in production of 90 calendar days or more.

If the water sensitivity falls more than ten percentage points below the minimum water sensitivity ratio specified for the type of mix, production should be stopped and a new mix design required.

404.06 METHOD OF MEASUREMENT AND DOCUMENTATION - CURRENT AND FINAL ESTIMATES. The Design and Quality Control of ACHM is not measured and paid separately. It is considered subsidiary to the various ACHM bid items.

SECTION 405

ASPHALT CONCRETE HOT MIX BASE COURSE

405.01 GENERAL. As with other hot mix asphalts, Asphalt Concrete Hot Mix Base Course is to be produced using an approved mix design. This mix design shall be prepared in accordance with the provisions of Section 404 of the Standard Specifications. Materials and equipment must comply with Section 409 of the Specifications. As with all items, the applicable Specifications (including special provisions or supplemental specifications) should be used as a reference when ACHM Base Course is used.

(a) Control of Materials. The Resident Engineer should note the following:

- An Accepted Mix Design must be on file and verified prior to allowing Hot Mix Asphalt operations to proceed.
- Asphalt Binder must come from preapproved sources (i.e., on the Department's "Qualified Products List") or each load prior must be tested and approved prior to use. Refer to the *Manual of Field Sampling and Testing Procedures*. Each shipment must be accompanied by a certified shipping ticket.
- Anti-strip, if used, must be that specified in the Mix Design and the amount used must be continually monitored.
- Release agents used by the Contractor and truckers must be on the "Qualified Products List" found in the *Manual of Field Sampling and Testing Procedures* or be otherwise approved by the Materials Division.
- Quality control and acceptance testing by Contractor personnel are to be performed in accordance with the procedures and frequencies contained in Sections 404 and 410 of the Standard Specifications. Department acceptance and verification tests are conducted at the minimum frequencies established in Subsection 410.09 of the Specifications. See *Subsection 106.04* of this Manual for information regarding verification testing.
- The hot mix asphalt must be handled, spread and compacted in such a manner that a consistent, non-segregated mat is obtained.

Additional information on frequency and testing of materials is found in the *Manual of Field Sampling and Testing Procedures* and in Sections 404 and 410 of the Specifications.

(b) **Compaction Tests.** At the beginning of the placement of each mix design, the Contractor shall establish an optimum rolling pattern which will produce the specification density, using a test strip of approximately 500 feet (150 meters). The Resident Engineer will observe the Contractor's use of a nuclear density gauge to verify that the maximum densities possible are obtained. The Contractor should establish a new rolling pattern if there is a change in the Accepted Mix Design, the compaction equipment or method, and/or if unacceptable results are obtained. In addition to this, densities (from asphalt cores or using the nuclear density gage) will be determined by the Contractor and/or Resident Engineer personnel to ensure compliance with the Specifications as the work progresses. Additional information on the frequency and testing procedures is found in the "*Manual of Field Sampling and Testing Procedures*."

(c) **Verification of Line and Grade.** The responsibility for computation of planned grades and setting sufficient stakes to provide control of the work is the same as described in *Subsection 210.01(b)* of this Manual. In addition, it is the responsibility of the Resident Engineer to verify compliance with the lines and grades staked. This is normally accomplished by "stringlining" the completed subgrade before placing the ACHM Base Course and by measuring the depth of the courses of ACHM Base as it is placed or by using the rolling straightedge on ACHM Surface and Binder Courses.

(d) **Seasonal and Temperature Limitations.** Hot mix asphalt materials shall not be mixed or placed when the surface temperature is below 40° F (5° C), or when there is frost in the base or subgrade, or at any other time when weather conditions are unsuitable for the type of material being placed.

Placement of ACHM Base Course and ACHM Binder Course shall be scheduled to minimize exposure to inclement weather. The amount of ACHM Base and/or Binder exposed at any time between December 1 and March 14 shall be limited to the area that can be covered with binder and/or surface course in one (1) day's normal production. Placing additional ACHM Base or Binder will not be allowed until the exposed course has been covered with binder and/or surface course. The succeeding course shall be placed as soon as weather and ground conditions allow.

See Subsection 410.12 of the Standard Specifications for additional information on seasonal limitations and *Subsection 410.05(c)* of this Manual regarding the use of partial lots during paving operations within the above time frame.

405.02 METHOD OF MEASUREMENT. Asphalt Concrete Hot Mix Stabilized Base Course is measured by the Ton (metric ton). The quantity of Asphalt Binder, and Mineral Aggregate to be paid for is computed from the weight of the total mix, using the accepted mix design percentages. This computation is to be made for each day's run. The computerized ETicket System shall be used to document the weights and calculations. *Section 109* of this Manual describes the procedures to be followed. Scale calibration and load tickets shall be handled in accordance with *Section 109*.

NOTE: On projects with a very small amount of this item, Form 19-213 (19-213m), "Daily Report of _____ Operations, Roadway Inspector's Record," may be utilized if the Resident Engineer feels the total quantity for the project does not justify

setting up the computer file and generating the computerized version. See Appendix III for instructions on completing this form.

405.03 DOCUMENTATION - CURRENT AND FINAL ESTIMATES. The computerized ETicket System shall be used as the Original Source Document(s) for Hot Mix Asphalt pay items. A copy of the accepted mix design must be submitted with the first daily report sent to Contract Estimates Section. A copy must also be sent of any subsequent changes to the mix design. Copies of revised or new mix designs should be submitted with the first daily report which pays for material produced under the new mix design.

NOTE: Truck weight tickets provided by the Contractor are also considered OSD's and shall be retained in the Resident Engineer's office.

No further documentation is needed for payment on Current and Final Estimates.

SECTION 406 ASPHALT CONCRETE HOT MIX BINDER COURSE

406.01 GENERAL. As with other hot mix asphalts, Asphalt Concrete Hot Mix Binder Course is to be produced using an accepted mix design. Materials and equipment must comply with Section 409 of the Specifications. The Contractor must also comply with the Construction Requirements of Section 410 of the Specifications. As with all items, applicable Specifications (including special provisions or supplemental specifications) should be used as a reference when ACHM Binder Course is used.

(a) Control of Materials. The Resident Engineer should note the following:

- An Accepted Mix Design must be on file and verified prior to allowing Hot Mix operations to proceed.
- Asphalt Binder must come from preapproved sources (i.e., on the Department's "Qualified Products List") or each load prior must be tested and approved prior to use. Refer to the *Manual of Field Sampling and Testing Procedures*. Each shipment must be accompanied by a certified shipping ticket.
- Anti-strip, if used, must be that specified in the Mix Design and the amount used must be continually monitored.
- Release agents used by the Contractor and truckers must be on the "Qualified Products List" found in the *Manual of Field Sampling and Testing Procedures* or be otherwise approved by the Materials Division.
- Quality control and acceptance testing by Contractor personnel are to be performed in accordance with the procedures and frequencies contained in Sections 404 and 410 of the Standard Specifications. Department acceptance and verification tests are conducted at the minimum frequencies established in

Subsection 410.09 of the Specifications. See *Subsection 106.04* of this Manual for information regarding verification testing.

- The hot mix asphalt must be handled, spread and compacted in such a manner that a consistent, nonsegregated mat is obtained.

Materials which do not comply with the Specifications and are outside the “Lot Rejection Limits” shown in Table 410-1 of Subsection 410.09 of the Specifications are to be removed and replaced at the Contractor's expense. Payment for material which falls under the “Price Reduction Limits” shown in Table 410-1 will be reduced in accordance with Subsection 410.09(d) of the Standard Specifications. All price reductions (item deductions) must be documented by approved change order.

Additional information on Quality Control and Acceptance sampling and testing is found in the *Manual of Field Sampling and Testing Procedures*, and Sections 404 and 410 of the Specifications.

(b) Compaction Tests. At the beginning of the placement of each mix design, the Contractor shall establish an optimum rolling pattern which will produce the specification density, using a test strip of approximately 500 feet (150 meters). The Resident Engineer will observe the Contractor's use of a nuclear density gauge to verify that the maximum densities possible are obtained. The contractor should establish a new rolling pattern if there is a change in the Accepted Mix Design, the compaction equipment or method, and/or if unacceptable results are obtained. In addition, soundings and densities are taken by the Contractor and/or Resident Engineer personnel as the work progresses to ensure compliance with the Specifications. Additional information on the frequency and testing procedures is found in the *Manual of Field Sampling and Testing Procedures*.

(c) Verification of Line and Grade. The responsibility for computation of line and grade and setting sufficient stakes to provide control of the work is the same as described in *Subsection 210.01(b)* of this Manual. In addition, it is the responsibility of the Resident Engineer to check the Contractor's work during construction and ensure that the work is being constructed in accordance with the line and grade staked. The use of the rolling straightedge is required to check the surface.

NOTE: The Specifications for this item include a maximum straightedge tolerance of 3/16" (5 mm), 1/4" (6 mm) if there is no profile grade on the plans. A rolling straightedge shall be used for checking this. However, prior to requiring corrective action, the Resident Engineer should isolate areas that are not within specification tolerances with a 10' (3 m) straightedge.

(d) Seasonal and Temperature Limitations. Hot mix asphalt materials shall not be mixed or placed when the surface temperature is below 40° F (5° C), or when there is frost in the base or subgrade, or at any other time when weather conditions are unsuitable for the type of material being placed.

Placement of ACHM Base Course and ACHM Binder Course shall be scheduled to minimize exposure to inclement weather. The amount of ACHM Base and/or Binder exposed at any time between December 1 and March 14 shall be limited to the area that

can be covered with binder and/or surface course in one (1) day's normal production. Placing additional ACHM Base or Binder will not be allowed until the exposed course has been covered with binder and/or surface course. The succeeding course shall be placed as soon as weather and ground conditions allow.

See Subsection 410.12 of the Standard Specifications for additional information on seasonal limitations and *Subsection 410.05(c)* of this Manual regarding the use of partial lots during paving operations within the above time frame.

406.02 METHOD OF MEASUREMENT. Asphalt Concrete Hot Mix Stabilized Base Course is measured by the Ton (metric ton). The quantity of Asphalt Binder, and Mineral Aggregate to be paid for is computed from the weight of the total mix, using the accepted mix design percentages. This computation is to be made for each day's run. The computerized ETicket System shall be used to document the weights and calculations. *Section 109* of this Manual describes the procedures to be followed. Scale calibration and load tickets shall be handled in accordance with *Section 109*.

NOTE: On projects with a very small amount of this item, Form 19-213 (19-213m), "Daily Report of _____ Operations, Roadway Inspector's Record," may be utilized if the Resident Engineer feels the total quantity for the project does not justify setting up the computer file and generating the computerized version. See Appendix III for instructions on completing this form.

406.03 DOCUMENTATION - CURRENT AND FINAL ESTIMATES. The computerized ETicket System shall be used as the Original Source Document(s) for Hot Mix Asphalt pay items. A copy of the accepted mix design must be submitted with the first daily report sent to Contract Estimates Section. A copy must also be sent of any subsequent changes to the mix design. Copies of revised or new mix designs should be submitted with the first daily report which pays for material produced under the new mix design.

SECTION 407

ASPHALT CONCRETE HOT MIX SURFACE COURSE

407.01 GENERAL. Refer to *Section 406* of this Manual (Asphalt Concrete Binder Course). The information contained in it is also applicable to "Asphalt Concrete Hot Mix Surface Course."

NOTE: There is no seasonal limitation on laying ACHM Surface Course. However, hot mix asphalt materials shall not be mixed or placed when the surface temperature is below 40° F (5° C), or when there is frost in the base or subgrade, or at any other time when weather conditions are unsuitable for the type of material being placed.

NOTE: The Specifications for ACHM Surface Course include a maximum straightedge tolerance of 1/8" (3 mm), 3/16" (5 mm) if there is no profile grade on the plans.

407.02 METHOD OF MEASUREMENT AND DOCUMENTATION - CURRENT AND FINAL ESTIMATES. Measurement and documentation for all Estimates shall be the same as for ACHM Binder. See *Section 406*.

**SECTION 408
VACANT**

**SECTION 409
MATERIALS AND EQUIPMENT FOR ASPHALT CONCRETE HOT MIX
BINDER AND SURFACE COURSES**

409.01 MATERIALS. This portion of the Specifications should be used as a reference when questions arise concerning the requirements for Mineral Aggregate and Asphalt Cement in ACHM.

409.02 EQUIPMENT. This portion of the Specifications should be used as a reference when questions arise concerning the requirements for equipment used to produce and lay ACHM.

All Asphalt Plants which produce ACHM for the Department must be inspected and certified by the Resident Engineer on an annual basis, and approved by the Materials Engineer. *Figure 409-1* contains an example of the Hot Mix Asphalt Plant Inspection Report Form. This form is available on the Construction Drive of the LAN under the Misc subdirectory as file *HOTFRM96.doc*. The Air Pollution Control Permit Number must be included on this inspection form. This information is given to the Arkansas Department of Pollution Control and Ecology (ADPCE) at its request.

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
HOT MIX ASPHALT PLANT
INSPECTION REPORT

DRYER:

Flights: Adequate _____
Worn, Needs Replacing? _____ Needs Cleaning? _____
Type of Fuel _____
Dust Collector Type: Baghouse _____ Wet Washer _____
Aggregate Feed/Mix Thermometer:
Range _____ Location of Sensor _____
Automatic Recording _____ Location _____

ASPHALT CEMENT:

Storage: Method of Heating _____
Location to Obtain Samples _____
Any Pipe or Fitting Not Insulated _____
Where? _____
Metered _____ Weighed _____
Date Scales Last Calibrated _____
Asphalt Feed Thermometer:
Range _____ Location of Sensor _____
Automatic Recording _____ Location _____
Anti-Strip Meter _____ Manufacturer _____
Cumulative Counter _____ Location to Obtain Sample _____
Internal Parts Non-Corrosive (Mfr. cert.) _____
Line Insulated _____

MIX STORAGE FACILITIES:

Storage Silo _____ Surge Bin _____
Capacity _____ Diameter _____ Height _____
Depth of Discharge Cone _____
Method of Distribution of Mix into Storage Silo _____
Mechanical Condition of Distribution Sys. _____
Malfunction Warning System _____
Heated _____ Inert Atmosphere _____

TRUCK SCALES:

Type: Springless _____ Digital _____ Date Calibrated _____
Manufacturer _____ Capacity _____
Automatic Printer _____

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
HOT MIX ASPHALT PLANT
INSPECTION REPORT

DATE: _____ DISTRICT _____

GENERAL PLANT INFORMATION

Plant Name _____
Air Pollution Control Permit No. _____
Plant Phone No. _____
Location _____
(Street No. or Rural Address, City)
Type of Plant: Batch _____ Drum _____ Screenless Batch _____ Other _____
Make: _____ Model: _____
Max. Rate of Production _____ Tons/Hr.

ALL PLANTS

STOCKPILES:

No. of Stockpiles _____
Agg. Size _____ No. of Stockpiles _____
Const. & Separation (Conform/Non-Conform) _____

COLD FEED:

Number of Bins _____
of bin 1 - Batch & Continuous Plants, Min. 4 - Drum, Batch w/o Screens, & Continuous w/o Screens Plants)
Partitions Adequate? _____
Rectangular Gate Opening _____
Method of Positively Controlling Gate Opening _____
Mineral Filler Bin or Silo? _____
Separate Feeding Unit for Mineral Filler? _____

SAFETY:

Are Moving Parts Guarded and Protected? _____
Any Loose Protections? _____
Ladders and Platforms Guarded with Handrails? _____
Provision for Hazardous Waste Storage (Secure) _____
Truck Loading Space Unobstructed and Clean? _____

FIGURE 409-1 ASPHALT PLANT INSPECTION REPORT

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
HOT MIX ASPHALT PLANT
INSPECTION REPORT

MIX CONTROL BATCH PLANT

Number of Hot Bins (Min. 3 Compartments) _____ Yes _____ No _____
Capacity of Bins Adequate? _____
Overflow Pipe _____
Location of Sample Portals _____
Scales and Weigh Box: _____
Type? Springless _____ Digital _____
Manufacturer _____
Location of Weight Indicator _____
Capacity (Aqgr) _____ Capacity (A.C.) _____
Date Last Calibrated _____
Discharge Gate Closes Tightly _____

PUGMILL (Twin):

Capacity _____ Capable of 5 Second Mixing Intervals _____
Blades Adequate _____ Worn _____
Clearance _____
Insulated _____

SCREENLESS PLANTS (Including Drum Mix Plants)

Automatic AC Feed Control _____
Indicator For Low AC Storage Level _____
Location Provided to Obtain Aggregate Belt Samples _____
Scalper Screen: Size _____ Location _____

DRUM PLANT (Only)

Method to Protect Asphalt From Flare _____
For Veil of Aggr. Protection, At What Minimum Mfr. Recommended Production Rate _____
Automatic asphalt feed rate capability _____

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
HOT MIX ASPHALT PLANT
INSPECTION REPORT

ASPHALT PLANT INSPECTORS LAB:

Location of Building _____
Square Feet Floor Space 20 m² (208 Sq. Ft.) Min. _____
Dimensions of Building 2.5 m x 8 m (8 Ft. X 26 Ft.) Min. _____
Lockable, door (with keys) and a screen door _____
Two screened windows, Min. _____
Heating Provided _____ Air Conditioning Provided _____
Adequate electric lights and power outlets (Min. one 220 VAC outlet) _____
Suitable toilet facilities reasonably close _____
Work Bench _____ Length (Comb. Length 6 m, 20 Ft., min.) _____
Depth _____ Height (750 mm, 30 In., min.) _____
Sink Provided _____ Size (500 mm, 20 In., Recommended) _____
Water Supply, Storage Capacity (200 L, 50 Gal., Min. or Connected to Water system) _____
Three Chairs, Shelves and/or Cabinets Provided _____
Storage Area for Nuclear Equipment, Lockable (with keys) _____
Desk with Drawers Provided _____
(Approx. 600 mm x 900 mm, 24" x 36", with 2 drawers Approx. 330 mm x 330 mm x 450 mm, 13" x 13" x 18") _____
At least One Type C Fire Extinguisher (10 pound Capacity, Min.) _____
Enclosed, Vented Compartment _____
Height Above Floor (750 mm, 30 In., Recommended) _____
Variable Speed Exhaust Fan, Capacity _____ (Min. Cap. 1 Times Lab. Vol. per min.)
Solvent Drain Present _____ Outside Container Shelter _____
Concrete Base for Compactor and Pedestal (or Acceptable Alternative) _____
Size (Approx. 750 mm, 30" square) _____

PLANT EVALUATION:

Overall Plant Condition: Well Maintained _____ Adequately Maintained _____ Poorly Maintained _____
Remarks: _____

INSPECTED BY: _____

CERTIFIED BY: _____
Resident Engineer

RECOMMENDED BY: _____
District Engineer

APPROVED BY: _____
Materials Engineer

FIGURE 409-1 (CTD.) ASPHALT PLANT INSPECTION REPORT

SECTION 410
CONSTRUCTION REQUIREMENTS FOR ASPHALT CONCRETE HOT MIX
BINDER AND SURFACE COURSES

410.01 Pre-Placement Conference. The Specifications require the Contractor to conduct a Pre-Placement Conference involving their personnel and the Resident Engineer's personnel prior to the start of paving operations. The Contractor's proposed plant, delivery, laydown, and compaction equipment and methods should be discussed and, if deemed necessary, inspected by the RE. The accepted mix designs and materials to be used should also be discussed. The proposed mixing and compaction temperatures, sampling and testing plan, haul route, rolling pattern, and other pertinent information should also be discussed. The Contractor should document all items discussed at the Conference and furnish a copy to the Resident Engineer within ten calendar days after the Conference. The requirement to hold this conference may be waived by the Resident Engineer based on acceptable past performance by the Contractor on projects assigned to the RE Office; however, the conference is still suggested even in these situations especially to discuss quality control and acceptance sampling and testing.

410.02 PREPARATION OF EXISTING BASE. Prior to laying ACHM base, binder or surface, all required corrections to the existing surface shall be made. This includes filling pot holes, sags and/or depressions, in addition to altering the pavement crown as necessary, using ACHM binder or surface. Hand work and/or blading the ACHM is permitted for this work.

Also, excessive crack and/or joint filler is to be removed from old concrete pavements prior to the application of tack coat. This is subsidiary to the contract pay items and not paid for directly.

410.03 VACANT

410.04 PLACEMENT AND COMPACTION OF THE MIX. Among the items with which the Resident Engineer should be familiar in this section of the Specifications:

(a) The mixture is to be placed only on a base that shows no evidence of free moisture and only when weather conditions are suitable. (The Engineer may permit loads in transit when rains begin to be laid provided the mixture is within the temperature limits specified and the finished pavement meets specification requirements.)

(b) Surface and binder course mixtures shall not be placed on the roadway at a temperature lower than 250°F (125°C). Also, the Contractor should make efforts to place the ACHM within the compaction range shown on the Accepted Mix Design. The Resident Engineer and his personnel shall check the temperature of the Hot Mix Asphalt sufficiently to ensure that it is placed in accordance with the Specifications. It is not necessary, however, to record these temperatures checks, unless it is necessary to document rejection of the mix.

(c) Longitudinal joints of multiple layers of ACHM shall be offset from the layer below by approximately 6". The joints in the_top layer should be at the centerline or a

lane line. See subsection 410.07 of the Standard Specifications regarding proper longitudinal joint construction techniques.

(d) On roads under traffic, the mixture should be laid so that the adjacent lane is laid the next working day after the first lane is laid.

(e) The speed of the paver should be adjusted to minimize stopping the paver.

(f) At the beginning of the placement of each mix design, the Contractor shall establish an optimum rolling pattern which will produce the specification density, using a test strip of approximately 500 feet (150 meters). The Resident Engineer will observe the Contractor's use of a nuclear density gauge to verify that the maximum densities possible are achieved. The contractor should establish a new rolling pattern if there is a change in the Accepted Mix Design, the compaction equipment or method, and/or if unacceptable results are obtained.

(g) The maximum speed of any roller is 3 miles per hour.

(h) Maximum theoretical specific gravity test (AASHTO T 209) shall be performed for each acceptance and adjustment in payment test.

410.05 (a) ACCEPTANCE TESTING. As discussed in *Section 404* of this Manual, the Contractor must field verify the accepted mix design at the start of mix production or after an interruption in production of 90 calendar days or more. See Sections 404.04 and 410.09(a) of the Specifications regarding verification requirements and permitted adjustments.

Acceptance and price adjustments are based on standard lots of 3000 tons (3000 metric tons), with each standard lot divided into 4 sublots of 750 tons (750 metric tons) each. The Contractor obtains and tests one sample from each subplot at a location determined by the Resident Engineer using AHTD Test Method 465 (Procedure for Sampling by Random Number Table). Using the same test method to determine the sample location, the Resident Engineer obtains and tests one sample per lot. Acceptance test methods are shown in Subsection 404.04 of the Specifications and in the *Manual of Field Sampling and Testing Procedures*. Verification testing is conducted using the frequencies and methods shown in the *Manual of Field Sampling and Testing Procedures*. See *subsection 106.04* of this Manual for additional information on verification testing.

(b) ACCEPTANCE OF THE PAVEMENT. Acceptance of ACHM is based on:

- Test reports for the properties listed in Table 410-1 of the Specifications.
- Pavement smoothness, as described in Subsection 410.09(b)(2) of the Specifications.
- Segregation, as described in Subsection 410.09(b)(3) of the Specifications.

Acceptance of a standard lot, with respect to the properties in Table 410-1, is based on the average of the five tests performed on the lot: four Contractor subplot tests and one Department test. Acceptance of a partial lot is based on the average of the actual number of tests made on the partial lot.

The limits shown in Table 410-1 are based on the property values shown in the accepted mix design. When the average of the test results for a lot falls within the range shown as “Compliance Limits”, the lot is accepted for that particular property.

If the average of the test results for a property fall within the limits shown as “Price Reduction Limits, price adjustments are calculated in accordance with Subsection 410.09(d) of the Specifications and documented by Change Order. An analysis showing the calculation for the price reductions, as shown in *Figure 410-1*, must accompany the change order. This analysis form is available on the Construction Drive of the LAN (CSD4:\misc\chg_ordr\96analys.doc). A letter from the Contractor agreeing to the Item Deduction must accompany the Change Order.

CONTINUOUS PRODUCTION OF MATERIAL THAT DOES NOT QUALIFY FOR 100% PAYMENT IS NOT TO BE ALLOWED.

If the test result for a subplot for any single property, other than density, falls outside the limits shown as “Sublot Rejection Limits” in Table 410-1, the subplot will be removed and replaced at no cost to the Department. The Resident Engineer samples and tests the replacement material. The test results obtained by the RE are then averaged with the Contractor’s test results for the other three lots and the Department’s random acceptance test results to determine the acceptance of the entire lot. See Subsection 410.09(b)(1) of the Specifications for procedures for handling sublots with densities outside of the subplot rejection limits.

**ANALYSIS OF NON-COMPLYING PAYMENT MIXTURES
ASPHALT BINDER CONTENT, AIR VOIDS, VMA, STABILITY, AND DENSITY
TO ACCOMPANY CHANGE ORDER NO. _____**

JOB NO. _____ JOB NAME: _____
TYPE OF ACHM: _____ ACCEPTED MIX DESIGN NO. _____

ASPHALT BINDER CONTENT (%)

Report No.	Date of Report:			
Lot No.: Tons:	Station to Station			
Location:	Remarks:			
	%	# Dev.	x 12%	% Reduction

MARSHALL STABILITY (Lbs.) – NOT APPLICABLE ON SUPERPAVE MIXES

Report No.	Date of Report:			
Lot No.: Tons:	Station to Station			
Location:	Remarks:			
	%	# Dev.	x 10%	% Reduction

AIR VOIDS (%)

Report No.	Date of Report:			
Lot No.: Tons:	Station to Station			
Location:	Remarks:			
	%	# Dev.	x 10%	% Reduction

VMA (%)

Report No.	Date of Report:			
Lot No.: Tons:	Station to Station			
Location:	Remarks:			
	%	# Dev.	x 4%	% Reduction

DENSITY – FAILING SUBLOT

Report No.:	Date of Report:						
Lot No.: Tons:	Station to Station						
Location:	Remarks:						
	1 st Core	2 nd Core	3 rd Core	Avg.	# Dev.	x 4%	% Reduction
Density (%)							

DENSITY – FAILING LOT

Report No.:	Date of Report:			
Lot No.: Tons:	Station to Station			
Location:	Remarks:			
	%	# Dev.	x 4%	% Reduction

Resident Engineer

Date

FIGURE 410-1

(c) **PARTIAL LOTS.** The Specifications allow the Resident Engineer to establish partial lots at any time. The Specifications contain “normal” minimum and maximum sizes for partial lots, but in most cases the size of the partial lot should be determined based on the specific project situation. The use of partial lots is suggested to prevent carrying over untested material for an extended period of time or to accept sections of pavement that are not large enough to be considered as a standard lot. Example: 11,000 tons of ACHM Binder Course are placed to construct Stage I of a project. No other binder will be required until Stage II construction is complete. 9,000 tons of the mix should have already been tested and accepted as 3 individual lots. The RE would declare the remaining 2,000 tons a partial lot. Acceptance of this partial lot would be based on the average of 2 sublots of 750 tons each (sampled during placement of the subplot), one 500 ton subplot, and the Department’s acceptance/verification test taken from one of the three lots.

Partial lots should be used during placement of ACHM Base or Binder courses during winter months (December 1 through March 14) to insure that no material is covered by subsequent courses until it has been tested and accepted. Example: On January 7 and 8, the contractor places 3900 tons of ACHM Binder Course. Before permitting the surface course to be placed over this binder, the binder should be divided in to one 3,000 ton lot and one 900 ton partial lot. All acceptance tests must be received and accepted by the Resident Engineer before the binder is covered. The 900 ton remainder should not be considered as part of the next lot of binder that will be laid after the exposed binder is covered by surface course.

410.06 SURFACE TESTS. Surface courses and binder courses should be checked with the rolling straightedge as soon after the mixture is laid as practical. The Specifications require that surface and binder courses on main lanes and ramps be straightedged "immediately following the final rolling as conditions permit." When surface course or binder course straightedging indicates that the surface tolerance is not within Specification limits, the Contractor must perform corrections to the pavement and make changes to the paving operations before the next day's operations are allowed to begin.

PRIOR TO THE CONTRACTOR TAKING CORRECTIVE ACTION, AREAS NOT COMPLYING WITH THE SPECIFIED SURFACE TOLERANCES SHOULD BE CHECKED AND ISOLATED WITH A CONVENTIONAL 10' (3 METER) STRAIGHTEDGE.

The maximum tolerances allowed when checked by the 10' straightedge are found in the Specifications.

Transverse joints shall be checked immediately after the rolling of the joint and corrected as necessary before the paving is allowed to continue.

410.07 INCENTIVES. Section 410.10 of the Specifications provides for the payment of incentives when the entire quantity of either ACHM Binder Course or ACHM Surface Course meet the criteria shown in the Specifications. The test values used in the consideration for incentives are the test averages that were used to accept each lot. Individual subplot test results are not considered in calculating incentives. Incentive payments are documented by Change Order and must be accompanied by an attachment showing a summary of the lot test values qualifying the pavement for the incentives.

NOTE: Refer to Appendix VI for information regarding proper settings for ICC and KJ Law lightweight Profilometers.

SECTION 411 ASPHALT CONCRETE COLD PLANT MIX

411.01 GENERAL. The Contractor shall furnish a mix design performed by an asphalt design laboratory shown on the Department's QPL. The design will be performed in accordance with Section 404, AHTD Test Method 470. The asphalt concrete cold plant mix shall be furnished from sources listed on the Department's Qualified Products List. The Engineer will specify the type and grade of asphalt to be used. The asphalt shall be an MC-250, MC-800, MC-3000, or a summer or winter grade seasonal type asphalt. All acceptance sampling and testing by the Contractor shall be performed in a qualified laboratory by a certified technician. Requirements for technician certification and laboratory qualification are contained in the Department's *Manual of Field Sampling and Testing Procedures*. The accepted mix design shall be field verified by the Contractor at the start of mix production or after an interruption of more than 90 calendar days. Verification shall consist of test results showing that the values for gradation and asphalt content are within the tolerances shown on the mix design.

411.02 METHOD OF MEASUREMENT AND DOCUMENTATION - CURRENT AND FINAL ESTIMATES. Documentation for Current and Final Estimates shall be in the same manner as Aggregate Base Course measured by the Ton (Metric Ton). Payment will be made for the total mix with no breakdown into components. See *Section 303* of this manual.

SECTION 412 COLD MILLING ASPHALT PAVEMENT

412.01 GENERAL. This item consists of cold milling asphalt pavement to the depth as shown on the plans. The milling machine used must be equipped with automatic slope and grade controls. The Contractor must make provision to remove the milled material from the roadway. The milled material, unless otherwise provided, will be the property of the Contractor.

412.02 METHOD OF MEASUREMENT. "Cold Milling Asphalt Pavement" shall be measured by the square yard (square meter) of pavement milled to the depth specified.

412.03 DOCUMENTATION - CURRENT ESTIMATES. Current Estimate documentation for this item may be based on a percent of plan quantity, a percent of plan quantity within specified Station limits, approximate field measurement, etc. Current Estimate documentation for "Cold Milling Asphalt Pavement" must be recorded on the "Report of Work Performed" (RWP) and marked "Current Estimate".

An example of a properly completed RWP for Current Estimate documentation on the above item is found in *Figure 412-1*. Additional information on the completion of RWPs is found in *Subsection 109.02* of this Manual.

412.04 DOCUMENTATION - FINAL ESTIMATES. Final Estimate documentation for "Cold Milling Asphalt Pavement" is to be based on "Actual Field Measurement" of the milled pavement. The Original Source Document (OSD) that must accompany the Final Estimate is the RWP marked "Final Document" for each item. The measurements shall be shown on the RWP or on attached sheets.

An example of a properly completed RWP for Final Estimate documentation on the above item is found in *Figure 412-2*. Additional information on the completion of RWPs is found in *Subsection 109.02* of this Manual.

SECTION 413

VACANT

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
CONSTRUCTION DIVISION - REPORT OF WORK PERFORMED
ITEM: COLD MILLING ASPHALT PAVEMENT ITEM CODE: 412001M
JOB NO. R11177 FAP NO. 1R-771-3(65) JOB NAME ALGA - AMAGON
☒ CURRENT ESTIMATE DATE 11-3-98 REPORT NO. 1 FINAL
☐ FINAL DOCUMENT

Pay Quantity	Unit	Description Location	Sub Item #
28866.7	SQ M	SEE BELOW	
28866.7	SQ M	TOTAL TODAY	
		PREVIOUS TOTAL	
28866.7	SQ M	TOTAL TO DATE	

BASIS OF ESTIMATE: ACTUAL FIELD MEASUREMENT

STATION	STATION	LENGTH (m)	WIDTH (m)	AREA (SQ M)
10+00	21+08.32	1108.32	7.32	8112.9
21+37.41	50+00	2862.59	7.25	20753.8
		TOTAL		28866.7

REPORTED BY: Regan Clark CHECKED BY: Anna Rowe Rev. 6-894

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
CONSTRUCTION DIVISION - REPORT OF WORK PERFORMED
ITEM: COLD MILLING ASPHALT PAVEMENT ITEM CODE: 412001M
JOB NO. R11177 FAP NO. 1R-771-3(65) JOB NAME ALGA - AMAGON
☒ CURRENT ESTIMATE DATE 3-16-98 REPORT NO. 2
☐ FINAL DOCUMENT

Pay Quantity	Unit	Description Location	Sub Item #
5243	SQ M	SEE BELOW	
5243	SQ M	TOTAL TODAY	
15812	SQ M	PREVIOUS TOTAL	
21055	SQ M	TOTAL TO DATE	

BASIS OF ESTIMATE: APPROX. FIELD MEASUREMENT

STA.	STA.	LENGTH (m)	WIDTH (m)
15+25	21+00	6 m	WIDTH
		525 m x 6 m = 3150 SQ M	
STA.	21+08	24+30	6.5 m WIDTH
		322 m x 6.5 m = 2093 SQ M	
		TOTAL THIS ESTIMATE	5243 SQ M

REPORTED BY: Edmond White CHECKED BY: H. Vignar Rev. 6-894

FIGURES 412-1 & 412-2

SECTION 414

ASPHALT CONCRETE PATCHING FOR MAINTENANCE OF TRAFFIC

414.01 GENERAL. Refer to *Section 406* of this Manual (Asphalt Concrete Binder Course). The information contained in it is also applicable to "Asphalt Concrete Patching For Maintenance of Traffic."

Materials and equipment shall conform to the requirements of ACHM Surface Course, Section 407, or Asphalt Concrete Cold Plant Mix, Section 411 of the Standard Specifications.

414.02 METHOD OF MEASUREMENT AND DOCUMENTATION - CURRENT AND FINAL ESTIMATES. Documentation for Current and Final Estimates shall be in the same manner as Aggregate Base Course measured by the Ton (Metric Ton). Payment will be made for the total mix without breakdown into components. See *Section 303* of this Manual.

SECTION 415

ASPHALT CONCRETE PATCHING OF EXISTING ASPHALT ROADWAY

415.01 GENERAL. Refer to *Section 406* of this Manual (Asphalt Concrete Binder Course). The information contained in it is also applicable to "Asphalt Concrete Patching of Existing Asphalt Roadway".

Prior to placing patching, the unstable area(s) in the roadway and shoulders, as designated by the Resident Engineer, shall be removed to provide firm, vertical sides and a firm, stable bottom that is generally parallel with the existing pavement surface. The sides of the resulting hole(s) are then tacked. Placement of the patching material shall be in uniform layers, not to exceed 4" (100 mm) loose measurement. This material shall be compacted using mechanical tampers or other approved methods.

NOTE: The asphalt concrete used for this item shall conform to the requirements of "ACHM Binder Course" or "ACHM Surface Course".

415.02 METHOD OF MEASUREMENT AND DOCUMENTATION - CURRENT AND FINAL ESTIMATES. Measurement and documentation for Current and Final Estimates shall be in the same manner as Aggregate Base Course measured by the Ton (Metric Ton). Payment will be made for the total mix without breakdown into components. See *Section 303* of this Manual.

Tack Coat used in conjunction with this item is considered subsidiary and is not paid for separately.

SECTION 416 RECYCLED ASPHALT PAVEMENT

416.01 GENERAL. Refer to *Sections 405, 406, and 407* of this Manual, as applicable. The information contained in these is also applicable to "Recycled Asphalt Pavement."

NOTE: The job mix for this item must contain a minimum of 70% virgin material. The softening agent used shall be approved prior to use.

416.02 METHOD OF MEASUREMENT. This item shall be measured by the Ton in the same manner as other Asphalt mixtures. Refer to *Sections 405, 406, and 407* of this Manual as applicable. The softening agent used will not be measured for payment. If the Contractor elects to use reclaimed material in the mix, the percentages of asphalt binder and mineral aggregate to be paid for will be determined from the accepted mix design. The residual asphalt in the reclaimed material will be paid for at the contract unit price bid for Asphalt Binder in ACHM. The mineral aggregate in the reclaimed material will be paid for at the contract unit price bid for Mineral Aggregate in ACHM.

416.03 DOCUMENTATION - CURRENT AND FINAL ESTIMATES. Documentation for Current and Final Estimates shall be in the same manner as ACHM Binder Course. Refer to *Subsection 406.03* of this Manual.

SECTION 417 OPEN GRADED ASPHALT BASE COURSE

417.01 GENERAL. The mix design for Open Graded Asphalt Base Course will be performed by the Department. Materials will conform to the requirements of Sections 409 and 417.02 of the Specifications.

417.02 QUALITY CONTROL AND ACCEPTANCE TESTING. Quality control sampling and testing for this item will be performed by the Contractor in accordance with Subsection 404.04 of the Specifications, with the exception that only gradation and asphalt binder content are the only properties tested.

Acceptance sampling and testing will be performed in accordance with Subsection 410.09(a) except that the only properties tested for acceptance are asphalt binder content and gradation. See Subsection 417.06 of the Specifications for additional information on acceptance testing and for information on price adjustments for material outside the compliance limits.

417.03 CONSTRUCTION REQUIREMENTS. The mixture must be placed within 2 hours after production. The mixture shall not be mixed or placed when the surface temperature is below 40°F (4°C). The mixture is placed and compacted using one of the two methods shown in Subsection 417.05 of the Specifications.

The finished surface of the material is checked with the rolling straightedge and has a maximum surface tolerance of 1/2" (12 mm) when the profile grade is shown on the plans. Low spots may be corrected with additional open graded asphalt base course. High spots must be removed to within the tolerances using a method that does not contaminate the base with fines or damage the base course that remains in place. Grinding is not permitted.

No traffic or equipment is permitted on the hardened open graded asphalt base course except for the paver used for the subsequent layers. No haul trucks of any type are permitted on the open graded asphalt base course.

417.04 METHOD OF MEASUREMENT AND DOCUMENTATION – CURRENT AND FINAL ESTIMATES. Measurement and documentation for all estimates shall be the same as for ACHM Binder Course. See *Section 406* of this Manual.

SECTION 418 SLURRY SEAL

418.01 GENERAL. Two types of slurry seals are contained in this section of the Specifications: Slurry Seals and Polymer Modified Slurry Seals. The specifications should be reviewed carefully since polymer modified slurry seals have some requirements which conventional slurry seals do not.

418.02 MATERIALS AND MIX DESIGN. Prior to beginning the work, the emulsion supplier must furnish the Materials Division samples of the base asphalt used and any polymers used in the finished emulsion. See the *Manual of Field Sampling and Testing Procedures* regarding additional requirements for materials for this item.

The emulsified asphalt or polymer modified asphalt used in the paving mixture must cure sufficiently to allow traffic within two hours (one hour for polymer modified) when applied at an ambient air temperature of at least 77°F (25°C) and a relative humidity of not more than 50%.

The Contractor performs the mix design in accordance with Subsection 418.03 of the Specifications and submits the mix design to Materials Division for review at least 5 working days prior to beginning placement.

418.03 EQUIPMENT. The Specifications require that the proportioning / mixer unit be calibrated prior to beginning work on the project. AHTD Test Method 466 is used to verify the equipment's calibration. This calibration must be completed and accepted (using the test method above) for each project.

Frequent checking of the aggregate, emulsion, and cement rates should be done during each day's run to insure that the specified rates are being achieved.

When the pay item is Polymer Modified Slurry Seal, the Contractor must provide a scale system to weigh and print tickets for each loaded truck bound for the mixer on the

roadway. The scales must be inspected and certified by a scale mechanic in accordance with Subsection 109.01(f) of the Specifications.

418.04 SEASONAL LIMITATIONS. Slurry seal cannot be placed between October 16 and April 30. Air temperature or pavement temperature must be above 55°F (13°C). Any requests to begin or to continue placement outside of these dates must be recommended by the District and forwarded to Construction for concurrence. Such requests should be made by the Contractor far enough in advance of the cut-off dates so as to not delay the work should the request be approved.

418.05 ACCEPTANCE AND ADJUSTMENTS. Acceptance and adjustment are based on a lot size of 120,000 square yards (100,000 square meters). The lot is broken down into four sublots of 30,000 square yards (25,000 square meters). The Contractor will obtain and test one sample from each subplot for determination of asphalt content and aggregate gradation using the test methods specified in Subsection 418.06(h) of the Specifications. The Resident Engineer obtains and tests one sample for both acceptance and verification. See *Subsection 106.04* of this Manual regarding verification testing.

The results of the Contractor's subplot tests and the Department's test are averaged and compared to the limits shown in Table 418-1 of the Specifications to determine acceptance, price reduction, or subplot rejection. Price adjustments are calculated in accordance with Subsection 418.06(h) of the Specifications.

As with the other items in Division 400, continuous production of material not qualifying for full payment is not allowed.

418.06 METHOD OF MEASUREMENT.

(a) **Slurry Seal** is measured and paid for by the square yard (square meter) of area actually covered.

(b) **Aggregate in Slurry Seal (Polymer Modified)** is measured by the ton (metric ton) in trucks. Trucks must be weighed after loading from the stockpile before dumping into the mixer. Scale calibration certificate and weight tickets shall be handled in accordance with *Section 109* of this Manual.

(c) **Asphalt in Slurry Seal (Polymer Modified)** is measured by the gallon (liter) of emulsified asphalt incorporated into the mixture applied to the roadway, as indicated by the calibrated gauges/revolution counter on the mixing unit. A start and stop revolution count will be recorded for each application. The revolution count or gauge reading will then be converted into the actual gallons (liters) applied.

418.07 DOCUMENTATION – CURRENT AND FINAL ESTIMATES.

(a) **Slurry Seal.** Current estimate documentation for Slurry Seal may be based on a percent of plan quantity, a percent of plan quantity between specified station limits, approximate field measurement, etc. Current Estimate documentation for this item must be recorded on the "Report of Work Performed" (RWP) form and marked current estimate. See *Figure 418-1* for an example of a properly completed Current Estimate

RWP for this item. For additional information on RWPs, see *Subsection 109.02* of this Manual.

Final Estimate documentation for this item is to be based on “actual field measurement”. The OSD that must accompany the Final Estimate is the RWP marked Final Document. This shall contain “Actual Field Measurement” as the “Basis of Estimate” and will either show or have attached the measurements and calculations used to obtain the pay amount. See *Figure 418-2* for an example of a properly completed Final Estimate RWP for this item.

(b) Aggregate in Slurry Seal (Polymer Modified) and Asphalt in Slurry Seal (Polymer Modified). The mixer is calibrated and documented using the forms shown in *Figure 418-3*. These forms are available on the Construction Drive of the LAN (*CSD4:\misc\slurry\slurycal.doc*). Three calibration tests are performed to determine the average weight of the emulsion discharged per counter revolution. Three calibration tests are also required to determine the average weight of cement discharged per cement counter revolution.

Three calibration tests are performed for each of three individual gate settings in order to establish a plot of gate settings versus pounds of aggregate discharged per counter revolution. This chart is used during actual placement to determine the weight of aggregate placed within a particular section.

The original copies of all calibration worksheets, scale certifications, and a copy of the emulsion certification must accompany the first daily report for Slurry Seal (Polymer Modified)

The Slurry Seal (Polymer Modified) Daily Report Form shown in *Figure 418-4* (available on the LAN at *CSD4:\misc\slurry\dr-slry.doc*) will be used for documentation for both current and final estimates. The starting and stopping counter readings are recorded for each section of the slurry seal placement. This value is then multiplied by the average weight of emulsion per revolution determined in the calibration process. In turn, this value is divided by the unit weight of the emulsion (as shown on the emulsion supplier’s certification) to obtain the volume of emulsion placed within a section.

Net weights are obtained from the printed tickets for the aggregate hauling trucks and are entered on the report form. As with Asphalt Surface Treatment, no moisture correction is required. The cement/mineral filler used is determined from the number of revolutions of the cement counter multiplied by the average weight of cement discharged per revolution, as determined in the calibration process. The total weight of the cement/mineral filler is paid as Aggregate in Slurry Seal (Polymer Modified).

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
CONSTRUCTION DIVISION - REPORT OF WORK PERFORMED

ITEM SLURRY SEAL JOB NO. SA-98765 FAP NO. 999 JOB NAME Hwy 9 - Edgehill (Co. Road 36)
ITEM CODE: 418001M QUICK CODE: _____
☐ CURRENT ESTIMATE DATE 10-4-98 REPORT NO. 1 Final
☒ FINAL DOCUMENT

Pay Quantity	Unit	Description Location	Sub Item #
1346.0	sq m	STA 2+00 - 4+00	
1488.6	sq m	STA 4+00 - 6+20.53	
2779.5	sq m	STA 6+32 - 10+45	
5614.1	sq m	TOTAL TODAY	
		PREVIOUS TOTAL	
5614.1	sq m	TOTAL TO DATE	

BASIS OF ESTIMATE: ACTUAL FIELD MEASUREMENT

Station	Station	Length	Width	sq m
2+00	4+00	200 m	6.73	1346.0
4+00	6+20.53	220.53 m	6.75	1488.6
6+32	10+45	413 m	6.73	2779.5
		TOTAL		5614.1

REPORTED BY: A. H. Hall CHECKED BY: Bob Jones Rev. 6-84

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
CONSTRUCTION DIVISION - REPORT OF WORK PERFORMED

ITEM SLURRY SEAL JOB NO. SA-98765 FAP NO. 999 JOB NAME Hwy 9 - Edgehill (Co. Road 36)
ITEM CODE: 418001M QUICK CODE: _____
☒ CURRENT ESTIMATE DATE 9-21-98 REPORT NO. 2
☐ FINAL DOCUMENT

Pay Quantity	Unit	Description Location	Sub Item #
726.0	sq m	STA 4+00 - STA 6+20 (LT LANE PLACED)	
726.0	sq m	TOTAL TODAY	
311.5	sq m	PREVIOUS TOTAL	
1037.5	sq m	TOTAL TO DATE	

BASIS OF ESTIMATE: 50% PLANT QUANTITY AT ABOVE LOCATION

REPORTED BY: V. D. Jones CHECKED BY: Andrew Thomas Rev. 6-84

FIGURES 418-1 & 418-2

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
CALIBRATION WORK SHEET FOR SLURRY SEAL (POLYMER MODIFIED)

Page 1 of 3

Job No. _____ Job Name: _____
FAP No. _____ Date: _____ Inspector: _____

EMULSION CALIBRATION	
(minimum 100 revolutions of aggregate counter)	
Full Weight:	_____
Weight after Discharge:	_____
Lbs. of Emulsion discharged:	_____ ÷ No. of Revs. _____ = Lbs. per rev. _____
Full Weight:	_____
Weight after Discharge:	_____
Lbs. of Emulsion discharged:	_____ ÷ No. of Revs. _____ = Lbs. per rev. _____
Full Weight:	_____
Weight after Discharge:	_____
Lbs. of Emulsion discharged:	_____ ÷ No. of Revs. _____ = Lbs. per rev. _____
Average Lbs. per rev. _____ (carry out to hundredth)	

CEMENT CALIBRATION	
(minimum 25 revolutions of cement counter)	
Full Weight:	_____
Weight after Discharge:	_____
Lbs. of Cement discharged:	_____ ÷ No. of Revs. _____ = Lbs. per rev. _____
Full Weight:	_____
Weight after Discharge:	_____
Lbs. of Cement discharged:	_____ ÷ No. of Revs. _____ = Lbs. per rev. _____
Full Weight:	_____
Weight after Discharge:	_____
Lbs. of Cement discharged:	_____ ÷ No. of Revs. _____ = Lbs. per rev. _____
Average Lbs. per rev. _____ (carry out to hundredth)	

FIGURES 418-3

AGGREGATE CALIBRATION (min. 50 revolutions)

GATE SETTING _____"

	TEST 1	TEST 2	TEST 3
Gross Weight (Lbs.)			
Weight after Discharge (Lbs.)			
Lbs. Aggr. discharged			
No. of Revolutions			
Lbs. of Aggr./Rev.*			

Average Lbs. of Aggregate per Revolution: _____ (carry out to the hundredth)

GATE SETTING _____"

	TEST 1	TEST 2	TEST 3
Gross Weight (lbs.)			
Weight after Discharge (lbs.)			
Lbs. Aggr. discharged			
No. of Revolutions			
Lbs. of Asgr./Rev. *			

Average Lb. of Aggregate per Revolution: _____ (carry out to the hundredth)

GATE SETTING

	TEST 1	TEST 2	TEST 3
Gross Weight (Lbs.)			
Weight after Discharge (Lbs.)			
Lbs. Aggr. discharged			
No. of Revolutions			
Lbs. of Aggr./Rev. *			

Average Lbs. of Aggregate per Revolution: _____ (carry out to the hundredth)

* Lbs. Aggregate Discharged ÷ No. of Revolutions (carry out calculation to the hundredth)

FIGURES 418-3 (Ctd.)

POUNDS OF AGGREGATE

[illegible]

GATE SETTINGS

ASPHALT Type _____ Tank No. _____ Seal No. _____

Total this Date	
Previous this Date	
Total including this Date	

Cement/Mineral Filler (from Summary Table below) + 2000	
Total this Date	
Previous this Date	
Total including this Date	

[illegible]

Resident Engineer _____

Copy: Job Inspector (Optional)